1,003,717

PATENT SPECIFICATION 1,003,717

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements in and relating to Folding Machines.

We, SCHNELLPRESSENFABRIK FRANKENTHAL ALBERT & CIE., AKTIENGESELLSCHAFT, a German Company, of Frankenthal/Pfalz, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a rotary folding machine for cutting and folding paper supplied in at least one continuous web and more particularly to a folding cylinder provided with two cutting grooves, paper holding pins adjacent the cutting grooves and two folding blades midway between the cutting grooves.

In folding machines of this kind it is difficult to avoid tearing of the paper at the holding pins and to maintain the correct tension in the still uncut web.

To overcome these difficulties, it has already been proposed to adjust the folding cylinder diameter. When the folding cylinder is to be enlarged, a number of annular pieces must be unscrewed to be screwed on again with an appropriate intermediate shim. To reduce the diameter of the cylinder, the appropriate number of intermediate shims are removed. This method of changing the cylinder diameter is complicated and slow.

In another device for enlarging and reducing the diameter spring strips are used, of which one end is attached to the cylinder while the other end is radially displaceable to cause the spring strips to bulge outwardly in the middle only. This has the disadvantage that the cross section of the cylinder does not remain circular when altered in size. A uniform setting of the strips is very difficult and takes much time.

According to the present invention a folding cylinder for a rotary folding machine is provided with two cutting grooves paper holding pins adjacent the cutting grooves, paper folding blades midway between the cutting grooves and a plurality of sets of springy strips of segmental form and extending peripherally between the cutting grooves and the folding blades, the sets of strips being axially spaced apart, each springy strip having two holders which are pivotally connected to cranks attached to spindles which are spring biassed, tending to force the springy strips outwardly, set levers being attached to said spindles at one end of the cylinder and resting under said bias on corresponding inclined faces of the stepped surface of a stepped cam disc whereby angular adjustment of the cam disc adjusts the effective cylinder diameter.

It can readily be seen that it is not necessary to add or remove any parts in order to adjust the diameter of the folding cylinder. Furthermore, the cylinder remains substantially round during such adjustment.

Adjustment of the diameter may be made extremely simple by mounting the stepped cam disc for rotation on a carrier ring at one end of the cylinder so that it can be angularly adjusted by an adjusting screw whose screw thread engages a screw-threaded bore of a pin pivotably mounted in the stepped cam disc the adjusting screw being mounted for rotation in a bushing attached to the cylinder.

The springy strips which enable the cylinder diameter to be changed are biassed, preferably by torsion springs in such a manner that the springy strips yield resiliently towards the cylinder axis on the occurrence of a stoppage.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a cross-section through a folding

[*Price* 4*s.* 6*d.*]

cylinder for a rotary folding machine and constructed in accordance with the invention;

Fig. 2 is a view of the end of the folding cylinder showing a stepped disc thereon;

Fig. 3 is a longitudinal view of the folding cylinder partly in section;

Figs. 4 and 5 are two views of details showing the method of securing one end of a spring steel strip of the folding cylinder; and

Figs. 6 and 7 show the method of securing the other end of the steel strip.

The drawings show the folding cylinder of a rotary folding machine adapted to cut and fold paper supplied in a plurality of continuous webs from a rotary press. The folding cylinder has a pair of diametrically opposed longitudinal grooved bars 2 whose grooves contain a rubber strip 2*a* cooperable with cutting blades (not shown) for severing the webs into sheets. Adjacent the strips 2*a*, the bars 2 are provided with holding pins 2*b* for carrying the sheets around the folding cylinder. The folding cylinder is also provided with a pair of diametrically opposed folding blades 3 with which a gripping device (not shown) co-operates to withdraw the sheets in a folded condition. The body 1 of the folding cylinder has a diameter smaller than the folding cylinder diameter required by the printing cylinder of the rotary press. For the purpose of producing the correct diameter according to the thickness of the set of sheets corresponding to the number of webs, sets of adjustable spring steel strips 13 of segmental shape are provided in the periphery of the cylinder, there being four strips 13 in each set and a plurality of such sets of strips axially spaced from one another.

Pairs of spindles 4, 4^1 are mounted to the right and left of the grooved bars 2 and to the right and left of the folding knives 3 for angular displacement relative to the cylinder 1. Cranks 5 are clamped to the said spindles by means of screws 6 and are located in recesses in the folding cylinder. Holders 8 are mounted on hinge pins 7 between the forked ends of those cranks 5 mounted on the spindles 4 while holders 10 are mounted on hinge pins 9 between the forked ends of those cranks 5 mounted on the spindles 4^1. Whereas the hinge pins 7 are round, the hinge pins 9 have flats on opposite sides thereof and are guided in slots 11 in the holders 10. Spring steel strips 13 are secured by one end to the holders 8 and by the other end to holders 10 by means of screws 12. The inter connection formed by the spring steel strips 13 makes the link system of the spindles 4 and the link system of the spindles 4^1 a single unit.

The spindles 4 and 4^1 carry at one end pinned set collars 14 and at the other end pinned set levers 15. Adjacent the set collars 14 and the set levers 15 and at the inside thereof there are torsion springs 16 of which one end engages in the set collars 14 or the set levers 15 and the other end bears against the cylinder 1. Due to the torsion in these springs, each link system of the two spindles 4 and 4^1 tends to force the corresponding spring steel strip 13 outwardly. The extent of this outward movement is restricted by means of the set levers 15, which rest on inclined faces of corresponding steps in the cam surface of a cam disc 17 which is mounted for rotation on a carrier ring 18 at one end of the cylinder 1, such carrier ring being attached to the cylinder 1 by means of screws 19.

Adjustment of the stepped cam disc 17 is effected by a setting device comprising a pin 20 mounted for rotation in the disc 17 and having a transverse screw-threaded bore. An adjusting screw 21 is screwed into this bore and its shank is guided in a bore in a clamp head of a pivotable retainer pin 22. The adjusting screw 21 is located in its axial direction by its head and a set collar 23. Tightening of a clamping screw 24 in the clamphead prevents the adjusting screw 21 from turning. The retainer pin 22 has a round shank which is mounted for rotation in a bushing 25 which is screwed into the end wall of the cylinder 1.

The setting device operates as follows:— it is necessary to enlarge or diminish the diameter of the folding cylinder 1 according to the thickness of the set of sheets. For enlargement of the cylinder, the clamping screw 24 is loosened and the adjusting screw 21 is rotated. Thus the stepped cam disc 17 is turned in the peripheral direction so that the set levers 15 come to bear against lower points of the inclined faces of the stepped cam disc 17.

When the set levers 15 rest against the lowest points of the inclined faces of the stepped cam disc 17, the diameter of the folding cylinder is at its largest, whereas it is at its smallest when the set levers 15 rest against the highest points of the stepped cam surface.

If a stoppage occurs, the spring steel strips 13 yield against the force of the torsion springs 16 to the pressure of stoppage. The diameter of the cylinder is thereby reduced to form a protection against excessive stoppage pressure. This effect is also supplemented by the resilience of the spring steel strips 13 themselves.

WHAT WE CLAIM IS:—

1. A folding cylinder for a rotary folding machine and provided with two cutting grooves, paper holding pins adjacent the cutting grooves, paper folding blades midway between the cutting grooves and a

plurality of sets of springy strips of segmental form and extending peripherally between the cutting grooves and the folding blades, the sets of strips being axially spaced apart, each springy strip having two holders which are pivotally connected to cranks attached to spindles which are spring biassed tending to force the springy strips outwardly, set levers being attached to said spindles at one end of the cylinder and resting under said bias on corresponding inclined faces of the stepped surface of a stepped cam disc whereby angular adjustment of the cam disc adjusts the effective cylinder diameter.

2. A folding cylinder as claimed in claim 1 in which the stepped cam disc is mounted for rotation on a carrier ring at one end of the cylinder and is angularly adjustable by an adjusting screw whose screw thread engages a screw-threaded bore of a pin pivotably mounted in the stepped cam disc, the adjusting screw being mounted for rotation in a bushing attached to the cylinder.

3. A folding cylinder as claimed in claim 1 or 2 wherein said spring bias is produced by torsion springs arranged about said spindles.

4. A folding cylinder for a rotary folding machine constructed and adapted to be adjusted in diameter substantially as herein described with reference to and as illustrated in the accompanying drawings.

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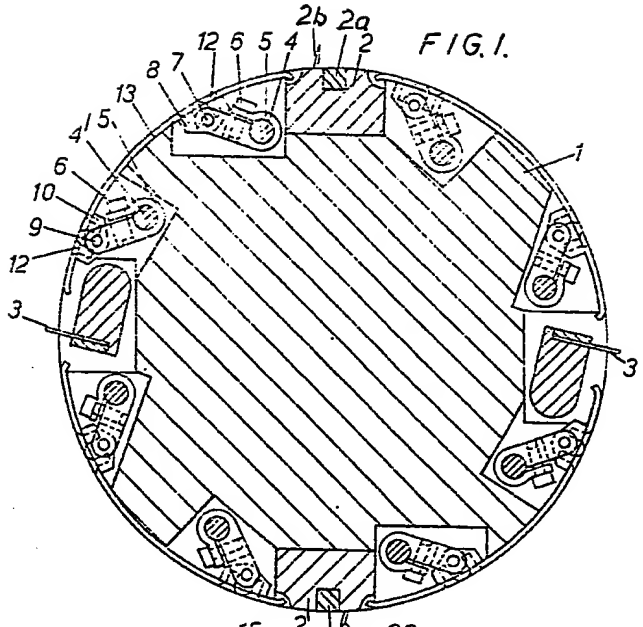

2b
2a
2
12
6
5
4
8
7
13
4'
5
6
10
9
12
3
1
3
2'
2a
2b

FIG. 1.

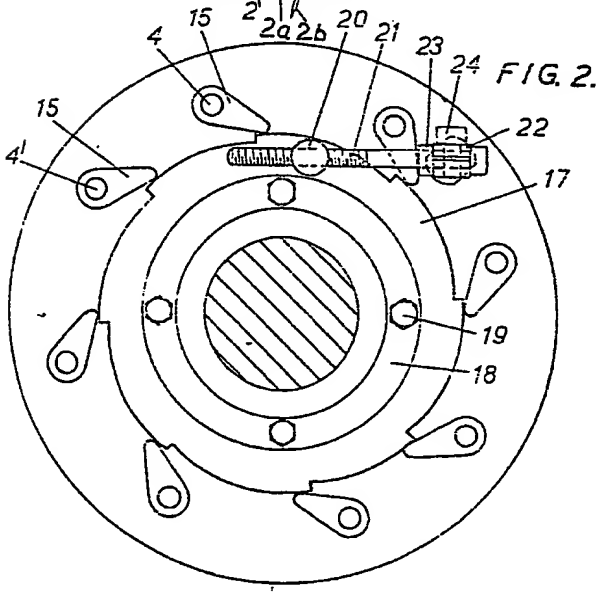
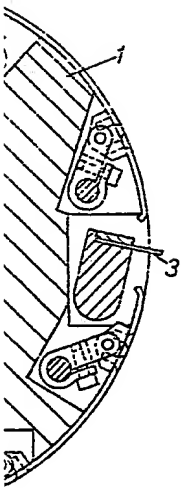

4
15
20
21
23
24
15
4'
22
17
19
18

FIG. 2.

1003717 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

G. 1.



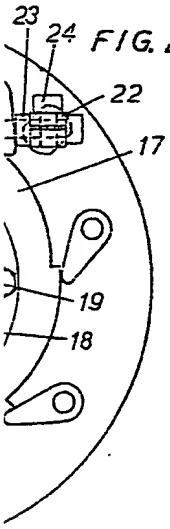
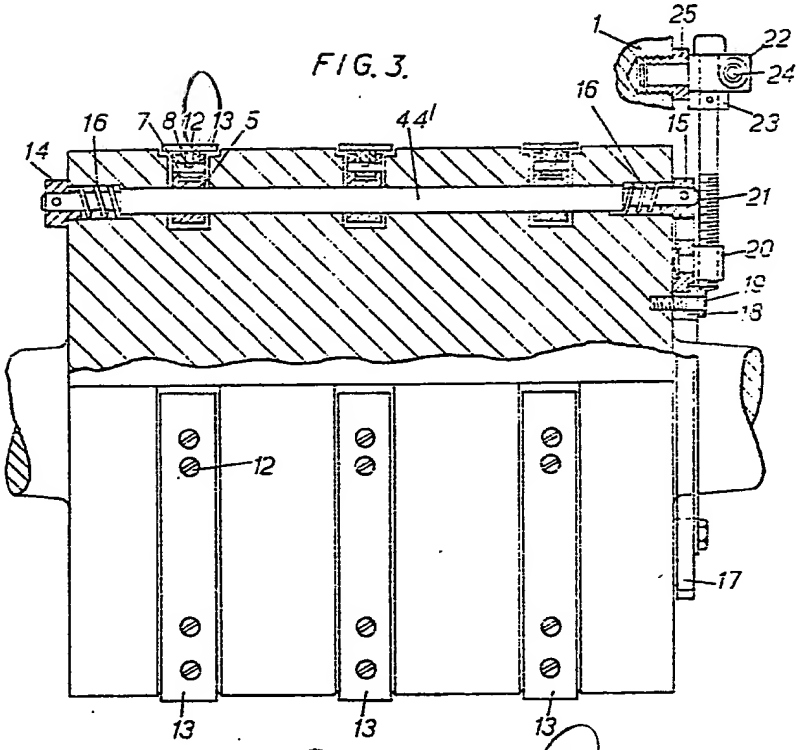


FIG. 2.

FIG. 3.



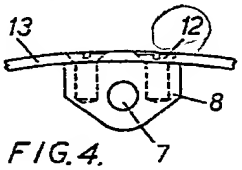


FIG. 4.

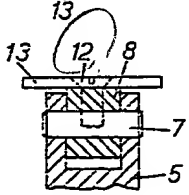


FIG. 5.

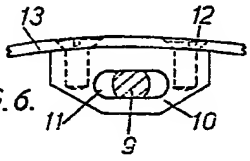


FIG. 6.

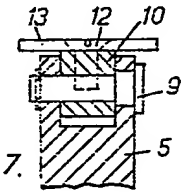


FIG. 7.

1003717 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

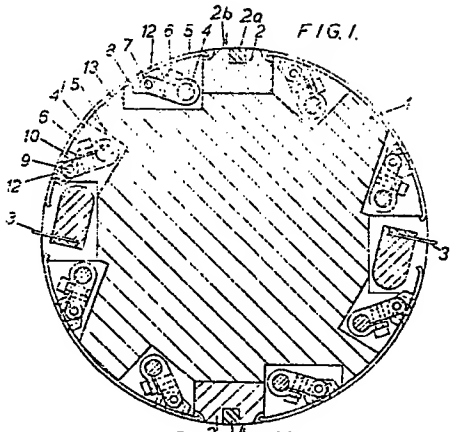


FIG. 1.

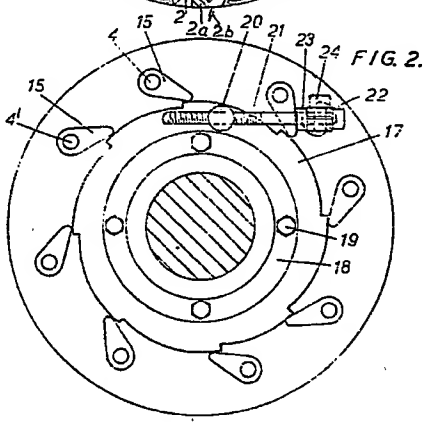


FIG. 2.

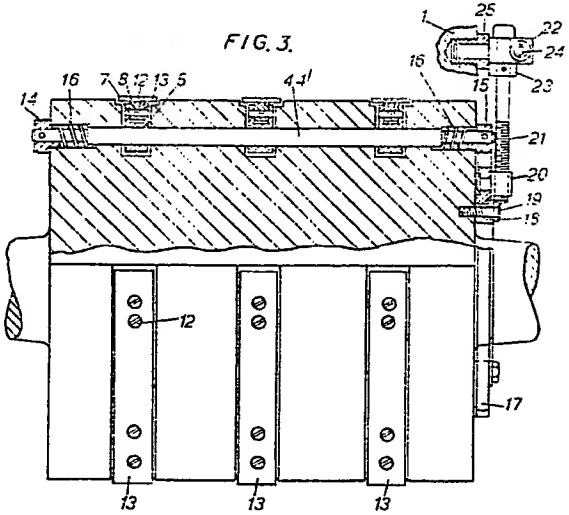


FIG. 3.

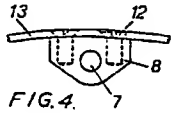


FIG. 4.

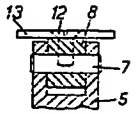


FIG. 5.

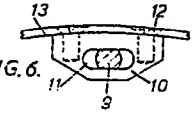


FIG. 6.

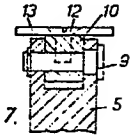


FIG. 7.